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Marine Casualty Investigations

Enquêtes sur les accidents maritimes

Investigation Report to the Minister pursuant to sections 542 or 545 of the Canada Shipping Act

Rapport d'investigation au Ministre conformément aux articles 542 ou 545 de la Loi sur la marine marchande du Canada

Canada

Ce rapport est aussi disponible en français.

REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES ATTENDING THE GROUNDING OF THE CANADIAN VESSEL "SIR ROBERT BOND" ENTERING PORT-AUX-BASQUES HARBOUR, NEWFOUNDLAND, FEBRUARY 8, 1988.

REPORT No. 516

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REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES ATTENDING THE GROUNDING OF THE CANADIAN VESSEL "SIR ROBERT BOND" ENTERING PORT-AUX-BASQUES HARBOUR, NEWFOUNDLAND, FEBRUARY 8, 1988.

Particulars of Vessel

Name	"SIR ROBERT BOND"
Official Number	347522
Port of Registry	St. John's, Newfoundland
Flag	Canadian
Call Sign	VGSS
Gross Tonnage	11,198
Net Tonnage	7,325
Length	126.5 m
Breadth	21.3 m
Depth	12.4 m
Draught (at time of incident)	F. 4.9 m A. 4.9 m
Type	Ro-Ro Rail, Passenger Ferry, Stern Door
Built	Port Weller Dry Docks St. Catherines, Ontario
Propulsion	4 English Electric Diesel Engines, 12 RK3CM, 8800 BHP, driving 2 c.p. propellers, bow and stern thrusters
Cargo	623 tons general cargo
Crew	49
Passengers	7
Classification	Lloyds
Owners	Marine Atlantic Inc. Moncton, N.B.

Navigating Equipment

Radar (1)	Decca RM1629, 3 cm., range Range 48 miles
Radar (2)	Decca 65322, 3 cm., range Range 48 miles
Loran 'C'	Racal-Decca Loran C 1028
Echo Sounder	Kelvin Hughes
Weather Receiver	Racal-Decca Navtex 1
Auto Pilot	Sperry
Gyro Compass	Sperry MK37 (4 Rep.)
Magnetic Compass	Sestrel
VHF (1)	Clipper V11
VHF (2)	Robertson VHF 100X
MF (1)	Skanti DS6000
MF (2)	Marconi CH150 SSB
Log	Sperry Doppler Speed Log SRD-301

NOTE: All times mentioned in this report are expressed in Newfoundland Standard Time (UTC minus 3½ hours).

Background

The "SIR ROBERT BOND" is a typical medium sized ro-ro rail passenger ferry with stern ramp. Her bridge is located forward of midships and the passenger accommodation. The engine room is located about midships. She has 4 diesel electric engines driving two controllable pitch propellers and is fitted with separate bow and stern thrusters.

On February 8, 1988, the "SIR ROBERT BOND" was en route from North Sydney, N.S. to Port-aux-Basques, Nfld. She was steaming at an average speed of 14 knots and following a charted course of 030°T. At 1807 the vessel entered Port-aux-Basques VTS radar surveillance zone and reported no defects or deficiencies. In preparation for docking, in a position 3½ to 4 miles off Channel Head, the master took over the conduct of the vessel from the officer of the watch. The

visibility was good but with snow flurries.

An alteration of course was made in order to head the vessel towards Shoal Point, followed by a second alteration in order to round Channel Head at a distance of about 0.25 mile and to bring the Port-aux-Basques range lights ahead. Shortly afterwards a heavy, wet snow squall occurred, reducing visibility to zero and causing the vessel's two radars to develop clutter to the extent that all targets and landmarks were obscured for several minutes. The master immediately slowed the vessel and moments later, while steaming on a course of 292°(T) and (G) at a speed of about 10 knots, she struck Middle Baldwin Shoal. The engine was stopped.

The vessel continued on that heading until she ran aground inside Port-aux-Basques Harbour on the Southeast corner of Vardy's Island. She was refloated without assistance on a rising tide about an hour later and berthed shortly after at the Marine Atlantic wharf. The following day she was permitted to proceed to St. John's Harbour, where permanent repairs were carried out in drydock. The vessel sustained extensive damage to her bottom shell plating and to her propellers. The estimated cost of repairs was in the region of 1.5 million dollars. There was no injury, cargo damage or pollution as a result of the casualty.

Narrative

On February 8, 1988 the Canadian rail passenger ferry "SIR ROBERT BOND" was engaged in the Gulf Service run between North Sydney, Nova Scotia and Port-aux-Basques, Newfoundland.

The vessel sailed from North Sydney at 1240, her ETA at Port-aux-Basques was at 1930 the same day. There were 7 passengers and some 31 units of freight, comprising various sizes of road trailers and of rail cars, on board. Navigation was carried out by the three deck officers and the master, who was responsible overall for the vessel's safe navigation. All were duly certificated and familiar with both the vessel and the coastal waters in which she sailed. Both deck and engine-room staff maintained a rotating watch of four hours on and eight hours off duty.

An uneventful passage was made to the approaches to Port-aux-Basques Harbour, following a charted course of 030°(T) and steaming at full speed.

Upon entering Port-aux-Basques VTS zone at 1807, the "SIR ROBERT BOND" reported, by VHF radio channel 14 (156.7 MHz), that her position was some 18 M off Channel Head, that

her course and speed were 030°(T) and 14 knots respectively and that the vessel had no defects or deficiencies. Clearance was requested.

Clearance was granted to the vessel to enter Port-aux-Basques Traffic Zone and various traffic information was supplied.

The afternoon watch (1600-2000) was manned by the first officer, quartermaster and lookout. The officer of the watch (OOW) entered the position of the vessel in the deck log book every hour. The Loran C position taken at 1900 was Lat. 47°26'N., Long. 59°07.5'W. The progress of the vessel was reported to VTS Port-aux-Basques. At 1828 the OOW reported that the vessel was 13 M off Channel Head and at 1910 that she was 5 M off. At this time the OOW gave an ETA of 1922-1925 for the next calling-in-point, a position 2 M off Channel Head.

During communication with Port-aux-Basques VTS, the vessel was advised of a southerly wind of 20 knots gusting to 30 knots in the harbour. When the vessel was 5 M off Channel Head and in accordance with his instructions, the master was called to the bridge to prepare for docking. The master took over the conduct of the vessel from the OOW when the vessel was 3.5 to 4 M off Channel Head. The visibility was considered good in snow flurries and the Port-aux-Basques lights were visible. At that time the ship's course was 020°(T&G). The master ordered a course alteration to 340°(T&G), to head for Shoal Point and to keep Southeast Shoal fine to starboard.

In the meantime, at 1915, the officer of the watch asked the engineer on watch to test the pitch, and bow and stern thrusters. Some five minutes later the engine-room reported the four main engines, three auxiliary generators and the thrusters were fully operational.

At 1925 the "SIR ROBERT BOND" reported in a position 2 miles off Channel Head. VTS acknowledged and requested the vessel to report again when secured alongside the wharf.

At about 1932 while in preparation for docking and after being informed that the pitch control and thrusters had been tested, the third mate relieved the first mate on the bridge. The first mate proceeded to the aft docking station with several seamen. The forward docking station was manned by the second mate and several seamen. The third mate tested the portable radiotelephones with those of the other officers at their stations, then proceeded to observe the port radar, as the master was observing the starboard radar.

At about 1935 the master ordered an alteration of course to port, rounding Channel Head at a distance off of about 0.25 M, proceeding on a course of 300°(T&G), in line with the Port-aux-Basques range lights. Reportedly the master observed the range lights visually at that time. The visibility was reported down to zero in snow and blowing snow with strong southwest winds. Shortly after, a small alteration of course to port was made to a heading of 295°(T&G), followed by another minor alteration of course to 292°(T&G) while the vessel was less than a cable from Graveyard Point breakwater. The reason for the alterations of course to port was to increase the passing distance off Pikes Island eastern breakwater. This was the master's standard approach to Port-aux-Basques harbour. Suddenly the two radars, each set at a 1.5 mile range, developed excessive clutter which obscured all targets and landmarks from the radar screens. This was reportedly caused by sudden, heavy, wet snow squalls. The visibility was considered zero from the bridge. The master immediately reduced the speed of the vessel to slow and it was entered in the engine-room log at 1938, first reduction. At 1940 the "SIR ROBERT BOND" struck Middle Baldwin Shoal on her starboard side at a speed of approximately 10 knots. Moments before striking the second officer forward reported sighting Graveyard Point western breakwater light on the port bow.

The master stopped the engines at once and ordered starboard helm, however, the helmsman did not hear the order and maintained the same heading.

Shortly afterwards, the first mate, from his station aft, reported sighting Pikes Island breakwater lights and the master ordered the helm 'hard to port' to clear Vardys Island. The helmsman notified the master that the vessel was not responding and was falling off to starboard. In an effort to correct the vessel's heading, the master put the bow thruster to port. Various manoeuvres were made to correct the ship's heading but to no avail.

The "SIR ROBERT BOND" came to rest off the south east corner of Vardys Island and developed a 5°-6° port list. The estimated time of grounding was between 1945 and 1950. The traffic centre called the vessel at 1943 inquiring about her close proximity to Vardy's Island and was informed that the rudder of the vessel was stuck.

By 2012 the vessel notified Port-aux-Basques of the grounding and that no assistance was required. The CCGS "JACKMAN" was in Port-aux-Basques and offered their assistance, however, the offer was not accepted. In the meantime, all watertight doors were in the closed position after striking bottom and all compartments were inspected for

water leakage; none was apparent. Various engine manoeuvres, including the use of the thrusters to free the grounded vessel were made, but to no avail. At 2000 the engine-room staff were instructed to pump out the forward heeling tanks to lighten the vessel forward.

At 2053 the master was successful in refloating the "SIR ROBERT BOND" under her own power on a rising tide and with the use of thrusters. The master attempted to turn the vessel to starboard towards the dock but he was not successful due to the strong westerly winds, so the starboard anchor was dropped to assist in the tight turn.

At 2105 fire was discovered in the exhaust stack of the stern thruster and within 15-20 minutes, after leaving the motor idling, the fire was out and the thruster was operational again. The crew had smothered the fire with water and CO_2 spray. The overheating of the exhaust apparently was caused by the extensive use of the thruster.

At 2115 the crew started weighing anchor and the "SIR ROBERT BOND" proceeded out of the harbour, where all machinery, steering gear and the thrusters were tested and found in working order. At 2158 the vessel re-entered the harbour and was secured safely.

On February 9, 1988 divers inspected the hull and the two propellers; extensive damage was found. After having obtained clearance from the Ship Safety Branch of the Canadian Coast Guard, the vessel sailed at 1735 that evening to St. John's, Newfoundland, to effect permanent repairs, where she arrived safely at 1850 on February 10, 1988. On February 12, 1988 the "SIR ROBERT BOND" entered drydock for repairs. There was no pollution or cargo damage reported as a result of the grounding.

Analysis

1. Machinery and Equipment

There was no electrical or mechanical failure in the main propulsion system, bow/stern thrusters or the main power supply prior to the grounding of the "SIR ROBERT BOND". The stern thruster overheated after the grounding because it was extensively used while attempting to refloat the vessel. After a few minutes of leaving it on idle speed, the thruster was operational again. While the thruster was idling the deck crew sprayed water on the thruster stack and sprayed some CO_2 into the stack.

2. Entrance to Port-aux-Basques

Port-aux-Basques is entered between Shoal Point, situated 1.1 miles west of Little Bay Head, and Channel Head, about 0.5 miles to the South. Channel Head is the eastern extremity of a small, rugged island lying close to the shore. There is a radar transponder beacon, with identification Morse Code "C" (-.-.) situated at Channel Head light. Southeast Shoal is a rock with a depth of 9.8 m. located about 0.5 miles east of Channel Head and marked with a buoy "QP" in season. The "SIR ROBERT BOND" steamed west of the Southeast Shoal on a course of 340° (T).

Port-aux-Basques leading lights are shown from the west side of the Harbour. Each light is shown from a square skeleton tower with a fluorescent-orange daymark having a white vertical stripe. The front tower is 6.4 m. high at an elevation of 38.8 m and the rear tower is 6.7 m. high, at an elevation of 67.5 m. These lights with Vardys Island lights in line bearing 300½° lead through the approach channel between the west breakwater and Middle Baldwin Rock. Middle Baldwin Rock, with a least depth of 1.8 m. lies nearly one cable NE of Graveyard Point West breakwater light. East Baldwin Rock, which dries 0.9 m. is situated 244 m. east of Middle Baldwin Rock. During the ice free navigation season these rocks are marked by buoys "QP2" and "QP4" and in the winter they are replaced by winter steel spars. The channel between Graveyard Point West breakwater and the Baldwin Rocks is narrow and is about 107 m. between the 3 fathom (5.5 m) contours. With high winds, berthing in the harbour is difficult.

The Graveyard Point western breakwater light, LL162, is white in color and located on the outer end of the breakwater with flood lights. The height of the tower is 2.2 m at an elevation above high water of 9.5 m.

The Pikes Island eastern breakwater light, LL170, is red in color and located on the outer end of the breakwater and has a new square skeleton tower 10 m high, at an elevation above high water of 17 m, installed in December 18, 1987.

The majority of the buoys marking the entrance to Port-aux-Basques were replaced by winter steel spars except for the following:

1 - Southeast Shoal "QP" LL 168.
2 - Graveyard Point breakwater "QP3"
3 - Pikes Island breakwater "QP6".

At the time of grounding all lights at Port-aux-Basques Harbour were lit.

3. Weather Conditions

The following hourly weather observations were obtained from the weather station at Port-aux-Basques, Environment Canada:

Time	Wind Dir.	Wind Speed Knots	VIS	Air Temp.	Remarks
1830	180°	22-35	1 3/4 ml.	-1.8C.	Drifting Snow
1930	240°	28-38	1 ml.	-1.0C.	Snow & Blowing Snow
2030	280°	28-40	2 ml.	-4.3C.	" " " "
2130	280°	34-49	6 ml.	-6.1C.	" " " "

At 1925, fifteen minutes prior to the grounding, the wind changed direction from southerly to southwest accompanied by a heavy, wet snowfall and reduction in visibility.

Low water at Port-aux-Basques was at 1840 with a predicted height of 0.8 m. and the tide continued to rise until high water which was at 0110 the following day, at a height of 1.6 m. The rising of the tide assisted in refloating the "SIR ROBERT BOND".

The sudden heavy, wet snowfall and the restricted visibility while the vessel was in her final approach were major factors in her grounding.

4. Charts and Publications

The "SIR ROBERT BOND" was carrying the appropriate Canadian charts and publications aboard in compliance with the Charts and Publications Regulations of the Canada Shipping Act. At the time of grounding, the master was using the largest scale chart No. 4641 "Port-aux-Basques and Approaches", new edition Aug. 31, 1984, corrected through Notices to Mariners, Edition 8, March 10, 1985. Radar fixes were not plotted on Chart # 4641; only courses were drawn on the chart.

5. Navigation Equipment and Position Monitoring

The "SIR ROBERT BOND" carried two radars, Loran C, echo sounder, magnetic compass and gyro compass with four repeaters on board. The radars, Loran C., magnetic compass and gyro compass were in use at the time of

grounding. The echo sounder was not in use and, although it would have indicated the rapidly shoaling water, its use would probably not have prevented the grounding.

Once the master took over the navigation, neither the first mate nor the 3rd mate later plotted the progress of the vessel on the appropriate chart, nor were they instructed by the master to do so.

The Recommended Code of Nautical Procedures and Practices, third edition 1985, published by the Ship Safety Branch clearly describes the duties and responsibilities of the personnel on duty pertaining to navigation and states the following:

6.(b) **Navigation**

During the watch the course steered, position and speed shall be checked at sufficiently frequent intervals, using any available navigational aids necessary, to ensure that the ship follows the planned course.

8.(c) **Navigational duties and responsibilities**

A proper record shall be kept of the movements and activities during the watch relating to the navigation of the ship.

21. **Navigation in coastal waters**

The officer of the watch should positively identify all relevant navigation marks.

The master was carrying out the navigation visually and by the use of the starboard radar. The ship's positions were not plotted after 1900 hours and there is no indication as to when or where the vessel started deviating from her proper course. Rounding Channel Head by a distance of about 1/4 mile, appears to be a standard approach towards Port-aux-Basques range lights, however, for the vessel to strike Middle Baldwin Shoal indicates that she was north of her course by a distance of about 75 metres. The VTS Regulator noted at one stage in the vessel's approach that she appeared slightly north of the Channel centre line. The width of the main channel between the 3-fathom contours is about 107 m.

This casualty shows that it is vital for those having the conduct of a vessel to comply with these recommendations and to be absolutely certain of the vessel's position at all times.

In view of the confines of the harbour, anticipated weather conditions, schedules expected, etc. some of the Port-aux-Basques ferries are fitted with a specialized visual (TV screen) electronic positioning equipment (PINS - Passive Instrument Navigational System). The "SIR ROBERT BOND" does not have this system. The system is well accepted and has greatly assisted berthing in the harbour in severely reduced visibility conditions. The system is unaffected by heavy snow.

The vessel's management considers this equipment experimental as second generation equipment is now under development which will offer a more economically feasible system as it will provide flexibility for other port usage.

6. Radars - "SIR ROBERT BOND"

The vessel was equipped with two Decca radars, Class B, 3 cm each. Both radars were operating on 1.5-mile range in the relative motion unstabilized 'ship's head up' display. The usual effects of adverse weather are to reduce the ranges at which targets can be detected and to produce unwanted echoes on the radar scope which may obscure the returns from important targets or from targets which may be dangerous to one's ship.

The Recommended Code of Nautical Procedures and Practices, Part II 'Recommendation on Operational Guidance for Officers in Charge of a Navigational Watch - Radar', states:

14. The officer of the watch should use the radar when appropriate and whenever restricted visibility is encountered or expected, and at all times in congested waters having due regard to its limitations.

15. Whenever radar is in use, the officer of the watch should select an appropriate range scale, observe the display carefully and plot effectively.

16. The officer of the watch should ensure that range scales employed are changed at sufficiently frequent intervals so that echoes are detected as early as possible.

17. It should be borne in mind that small or poor echoes may escape detection.

18. The officer of the watch should ensure that plotting or systematic analysis is commenced in ample time.

19. In clear weather, whenever possible, the officer of the watch should carry out radar practice.

Precipitation - Rain, hail and snow storms all may return echoes which appear on the PPI as a blurred or cluttered area. In addition to masking targets which are within the storm area, heavy precipitation may absorb some of the strength of the pulse and decrease maximum detection range. The antenna may become coated with wet snow impeding the outgoing and incoming signal. The two radars aboard the "SIR ROBERT BOND" transmit on the frequency of 3 cm. which is more subject to the effects of weather than radars transmitting at the longer wave lengths (10 cm). During the snow squalls both radars developed excessive clutter obscuring all targets. The master adjusted the sea clutter control and the gain control but to no avail. The sea clutter control is designed to suppress sea clutter to enable the detection of close targets which otherwise might be obscured by sea clutter. This control is used in conjunction with the receiver gain control.

The rain clutter control provides the means for breaking up rain/snow clutter with the result that important echoes are better contrasted against the snow and rain echoes, however, it was left in the 'off' position. (See Annex 1)

Although the VTS harbour radar comprises different equipment with many different technical characteristics, it also operates on the 3 cm. band and as noted in paragraph 8, the vessel could still be detected through the heavy snow in question. Given the various circumstances, it is therefore difficult to understand why the performance of the radars aboard the ship in the snow conditions were so poor, if they had been correctly adjusted.

10 cm. versus 3 cm. radar - The technical arguments which prevailed some years ago no longer persist, with 3 cm. clearly the more popular. However, many shipping companies, particularly with operations in colder climates, still prefer to fit one of each frequency in order to have the advantages of both. Some officers prefer 10 cm. even on the shorter ranges because of the

larger paint of the targets ('blobby echoes').

7. Speed of Vessel

The "SIR ROBERT BOND" was steaming at an average speed of 14 knots 'full away'. The first reduction of speed was at 1938 down to 'slow ahead' because of sudden heavy snow squalls which reduced the visibility to zero and extensively cluttered both radars. Moments later the vessel struck Middle Baldwin Shoal at an estimated speed of 10 knots, then the engine was put to stop until she grounded near Vardy's Island. The vessel is considered very manoeuverable with bow and stern thrusters.

Article 23, of Part II of the Recommended Code of Nautical Procedures and Practices, 1985 published by the Canadian Coast Guard states in part;

RESTRICTED VISIBILITY

> 23. When restricted visibility is encountered or expected, the first responsibility of the officer of the watch is to comply with the relevant rules of the applicable regulations for preventing collisions at sea, with particular regard to the sounding of fog signals, proceeding at a safe speed and having the engines ready for immediate manoeuvres...

The speed of the "SIR ROBERT BOND" at the time of entering the snow squall is considered high for the prevailing circumstances.

8. Port-aux-Basques Vessel Traffic Services

The centre is manned 24 hours a day, on eight-hour shifts, and provides a wide coverage of VHF Radio communications, including VHF channel 14 frequency 156.7 (MHZ). It also maintains radar surveillance on vessels moving within the zone.

On the day of the grounding one regulator was on duty from 1600 to 2400 hours monitoring the radar, radio communications, telex messages and telephone calls.

The centre is equipped with one radar and two displays. It is mainly used for monitoring vessels in the Gulf and the approaches to Port-aux-Basques Harbour. The radar antenna is located on a hill close to Graveyard Point western breakwater at a height of about 60 metres. The regulator monitored the progress of the "SIR ROBERT

BOND" initially on 24 and 6-mile range. After the "SIR ROBERT BOND" reported her position at 2 miles off Channel Head, the regulator reduced the radar range to 1.5 miles to keep a close watch on vessel movement within the harbour. The winter spars located at East and Middle Baldwin appeared in their advertised position on the VTS radar and the "SIR ROBERT BOND" was observed by the regulator to be making the normal approach but appeared to be slightly to the north of the centre of the channel. The VTS radar display has no 'Decca spots' to mark the centre of the channel or the outer limit. The vessel was observed passing the East Baldwin spar on her starboard side, then the radar discrimination between the vessel, the Middle Baldwin spar and the land was distorted. Factors affecting the range and bearing resolution are pulse length, receiver gain, CRT spot size, range scale, beam width and the range to the targets. During that time there was heavy snowfall appearing on the VTS radar display, however, the regulator was still able to observe the "SIR ROBERT BOND" until she ran aground near Vardy's Island and at 1943 the regulator questioned the vessel about her location. The VTS regulator was not aware that the vessel touched bottom on Middle Baldwin Shoal. The vessel informed the centre that her rudder was stuck and about half an hour later reported she was aground.

The reason for the delay was that the master felt there was no immediate cause for alarm and he would be able to free the vessel within a short time.

The Shipping Casualties Reporting Regulations state in section 4(1) and 4.(2)(a):

Preliminary Report

> 4.(1) Where a ship or a vessel being towed by a ship is involved in a shipping casualty, an accident or a dangerous occurrence, the master, any certificated officer, operator, member of the crew, pilot or person responsible for the ship or the vessel being towed shall report the incident without delay in accordance with subsections (2) and (3).
>
> (2) Subject to subsection (3), the report referred to in subsection (1) shall be made without delay
>
> (a) by radio communication to a Canadian radio ship reporting station, where the shipping casualty, accident or dangerous

> occurrence takes place in Canadian waters or on a voyage to or from a Canadian port or alongside a port facility in a Canadian port;
> ...

At the time of grounding there was no traffic in the immediate area.

9. Fuel and Lube Oil Aboard

The "SIR ROBERT BOND" was carrying some 183 tons of fuel in two fuel tanks, settling tank, day tank, bow and stern thrusters and aft furnace tanks. There were 10 tons of lube oil in the storage tank, C.P. oil tank, steering tank and gear oil tank.

After the incident all her fuel and lube oil tanks remained intact and no pollution was released from the vessel.

10. Damage to Vessel

The vessel sustained extensive bottom damage to her keel and the bottom shell plating as well as to both propellers, at an estimated cost of repairs of about 1.5 million dollars. While she was aground no sounding was taken around the vessel by the crew. The following is a summary of the damage survey:

- The keel plates were heavily set up, buckled and ruptured between frames 156 and 147. The indentation extends from frames 147 to 129, then along the port seam between frames 117 and 95. Starboard side keel plate was set up between frames 95 and 85.

- The bottom shell plates on the port side were set up and ruptured in some areas between frames 132 and 96.

- The bottom shell plates on the starboard side were set up and ruptured in some areas between frames 145 and 67.

- The port bilge keel was gouged and torn in two locations at frames 78 to 73 and frames 70 to 67.

- The port and starboard propellers, 4 blades C.P. were badly damaged with the tips missing on all eight blades. The blades were dented forward indicating that most of the damage occurred while she was going astern.

- The skeg was gouged and scored due to contact with bottom.

11. Fatigue

The average crossing time for the "SIR ROBERT BOND" is between 7 to 8 hours. The vessel arrives at Port-aux-Basques at 1930 and leaves at 2330, arriving North Sydney at 0730, and departing again at 1200 Newfoundland Standard Time. The vessel carries three certificated deck officers; each stands a four-hour watch. The master is normally called to the bridge about an hour or 45 minutes prior to docking which leaves him resting during the night crossing from about midnight until 0630 or 0645. On the return trip he would have an additional 6 hours of rest depending on weather conditions and the traffic situation.

On the day of grounding, the master had 5-6 hours of sleep at night, ate his breakfast and lunch and went to the wheel-house a few times during the afternoon watch until he was called at about 1900.

The master started his shift on February 1, 1988 for a period of two weeks, then he would have been off duty the following two weeks. There is no indication that fatigue was a contributing factor to the grounding.

12. Qualifications and Experience

The master holds a Canadian O.N.1 Certificate issued on February 18, 1981. He has 20 years experience as master aboard Marine Atlantic coastal ships which included 12 years experience on the run between North Sydney and Port-aux-Basques. He joined the "SIR ROBERT BOND" in 1979 until present and started his sea career in 1953 aboard fishing draggers and coastal vessels.

He received a Master Home Trade Certificate on April 15, 1966 and completed a Radar Observer Course and similar courses in that year. Apparently he had not attended any other approved radar courses since 1966.

The first officer holds a Canadian O.N.1 Certificate issued on June 4, 1985. He has two years experience as first officer and has been sailing as deck officer since 1978 aboard various Marine Atlantic coastal ships.

The second officer holds a 2nd. Mate Home Trade Certificate issued on May 30, 1960. He joined Marine Atlantic as third officer in 1961 and since then has been sailing in various capacities. He has about 20

years experience on Gulf run vessels.

The third officer holds a First Mate Home Trade Certificate issued on April 4, 1975. He has about 15 years experience as deck officer with Marine Atlantic, which included two and half years on the Gulf run vessels. He took a Radar Observer Course in 1972.

Findings

While inbound to Port-aux-Basques Harbour on February 8, 1988, under the conduct of the master and during heavy snow squalls, the "SIR ROBERT BOND" touched bottom on Middle Baldwin Shoal then grounded near Vardy's Island, as a result of an error in judgement in the navigation. It would appear that the following factors contributed to the grounding:

- the weather conditions were extremely poor due to a sudden, heavy, wet snowfall and gusting winds over the headland;
- the harbour is confined and leaves little room for error;
- there was no blind pilotage plotting regime in place;
- the radar presentations were reportedly solidly blanked by snow;
- the alteration of course was executed from a position not plotted on the chart;
- the vessel was to the north of her normal channel approach; and
- the vessel was not proceeding at a safe speed in the circumstances, and thus did not observe the recommendation to proceed at a safe speed in restricted visibility contained in the Recommended Code of Nautical Procedures and Practices.

Other Findings

Neither the master nor the third officer had attended any radar similator courses in the last 15 years.

The master did not request any progress report from the officer on the bridge.

No sounding was taken around the vessel after the grounding.

The vessel did not report the casualty immediately to Port-aux-Basques VTS, and thus did not meet her obligation under the Shipping Casualties Reporting Regulations.

The vessel is not equipped with a PINS system.

VTS, initially aware the vessel was slightly to the north of her course, did not detect that the course was unsafe until after the grounding.

A 10 cm. radar, correctly adjusted, would have performed better than the 3 cm. radar in the heavy snow conditions.

MARINE CASUALTY INVESTIGATIONS
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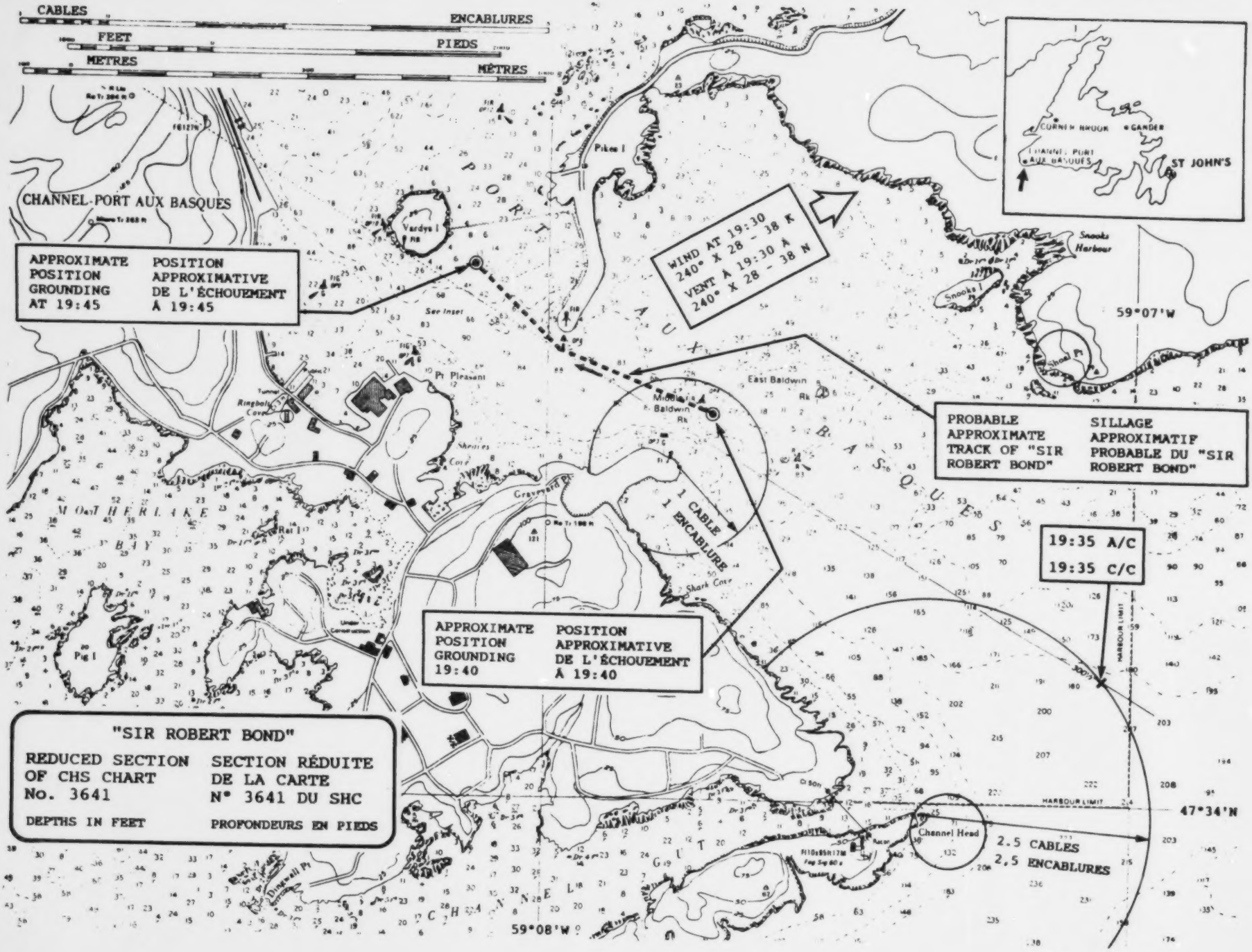
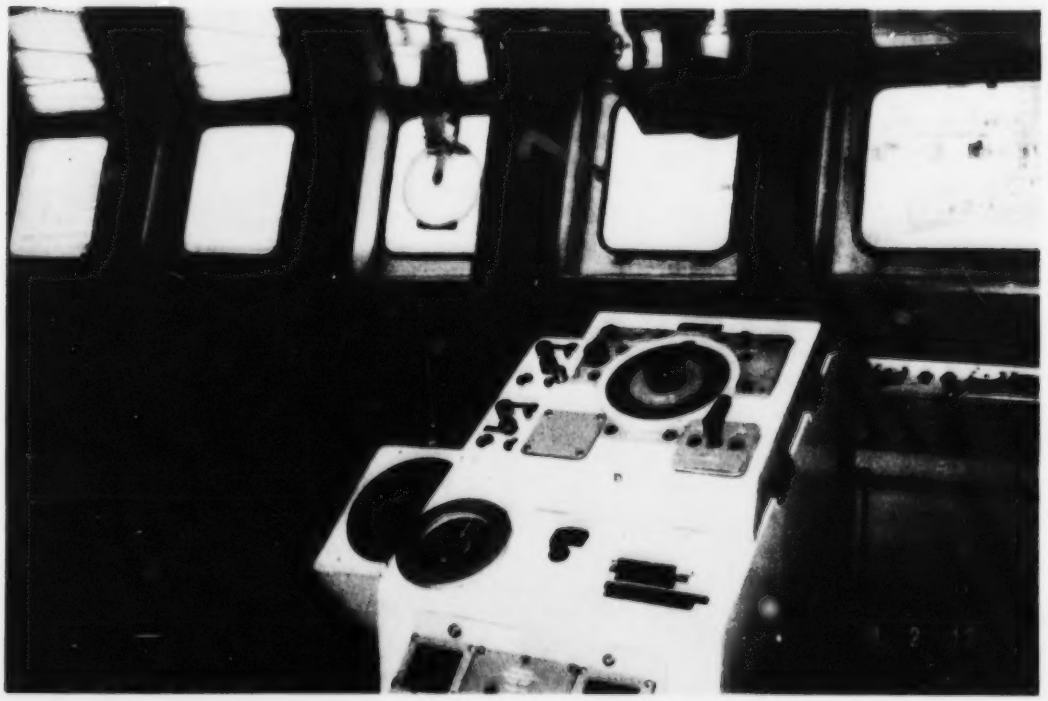
110 O'CONNOR
OTTAWA, ONTARIO
K1A 0N5

FEBRUARY, 1989


CABLES
ENCABLURES
FEET
PIEDS
METRES
MÈTRES
CHANNEL-PORT AUX BASQUES
APPROXIMATE POSITION GROUNDING AT 19:45
POSITION APPROXIMATIVE DE L'ÉCHOUEMENT À 19:45
WIND AT 19:30
240° X 28 - 38 K
VENT À 19:30
240° X 28 - 38 N
PROBABLE APPROXIMATE TRACK OF "SIR ROBERT BOND"
SILLAGE APPROXIMATIF PROBABLE DU "SIR ROBERT BOND"
1 CABLE
1 ENCABLURE
APPROXIMATE POSITION GROUNDING 19:40
POSITION APPROXIMATIVE DE L'ÉCHOUEMENT À 19:40
19:35 A/C
19:35 C/C
"SIR ROBERT BOND"
REDUCED SECTION OF CHS CHART No. 3641
SECTION RÉDUITE DE LA CARTE N° 3641 DU SHC
DEPTHS IN FEET
PROFONDEURS EN PIEDS
2.5 CABLES
2,5 ENCABLURES
59°07'W
59°08'W
47°34'N
PORT AUX BASQUES
MOUNT HERLAKE BAY
CHANNEL
GUT
Channel Head
Pt Pleasant
East Baldwin Rk
Shark Cove
Graveyard
Snooks Harbour
Snooks I
Vardys I
Pikes I
Pig I
Dingwall Pt
HARBOUR LIMIT
CORNER BROOK
GANDER
ST JOHN'S

TELEVISION TOWER
PYLONE DE TELEVISION
LEADING LIGHTS
RADAR TOWER
TOUR RADAR
CHANNEL HEAD LIGHT
FEU DE CHANNEL HEAD
PORT AUX BASQUES

"SIR ROBERT BOND" in drydock in St. John's, Newfoundland.
"SIR ROBERT BOND" en cale sèche à Saint-Jean, Terre-Neuve.



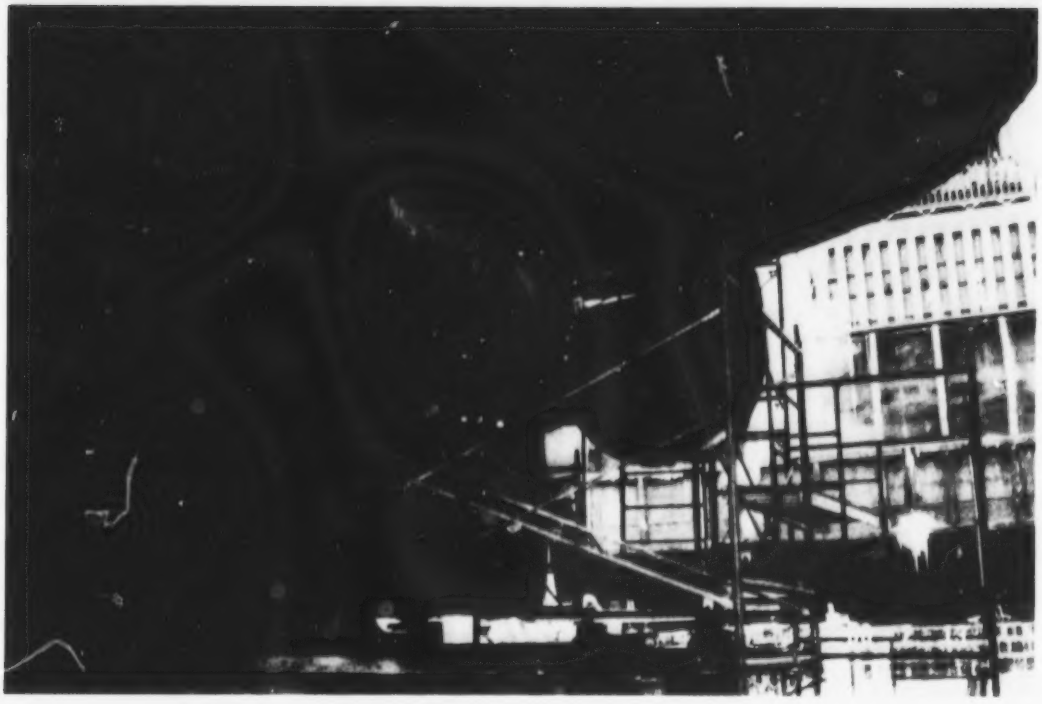
Wheel-house, showing gyro repeater, auto pilot, rudder indicator and port radar.

Vue de la timonerie où l'on peut apercevoir le répétiteur gyro, le pilote automatique, le répétiteur d'angle de barre et le radar de bâbord.

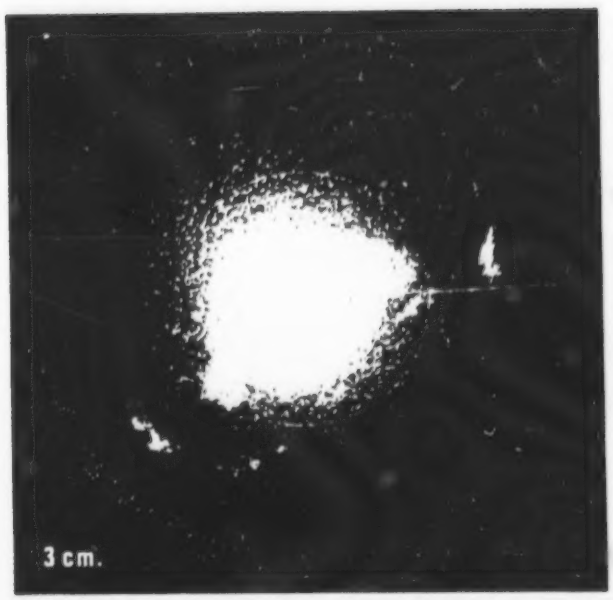
"SIR ROBERT BOND"

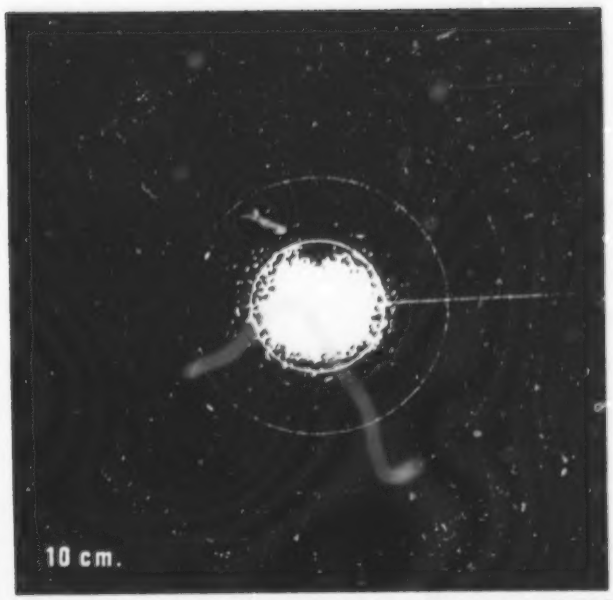
Forward hull damage. Coque à l'avant endommagée.

"SIR ROBERT BOND"

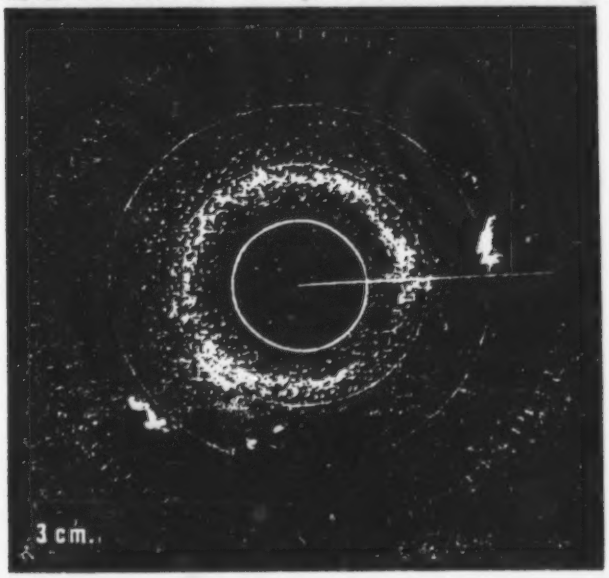


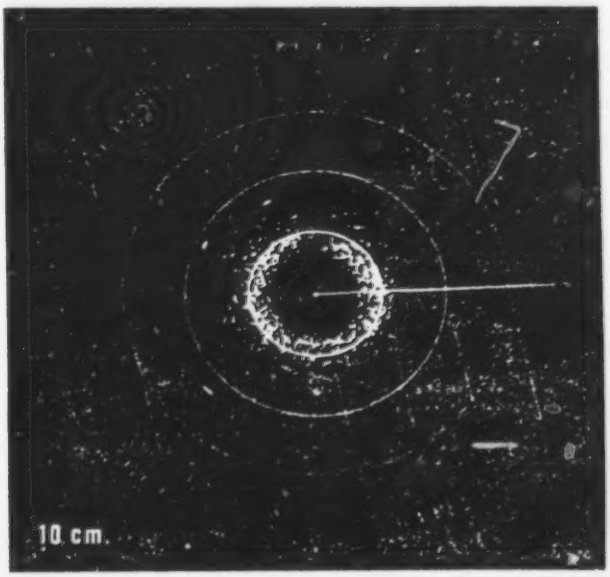
Damage to port and starboard propellers.
Hélices de bâbord et de tribord endommagées.





Two identical 8 mile range PPI pictures taken on Raytheon 3 cm. and 10 cm. radars in a rain squall and with a choppy sea. Three ships bearing 225°, 294° and 330° shown on the 10 cm. radar right are not shown on the 3 cm radar left.





On both radars the anti-rain and anti-sea clutter devices are switched in. The three ships are clearly visible on the 10 cm. radar right. There are no targets visible on the 3 cm. radar left as the echo power has been absorbed by rain.

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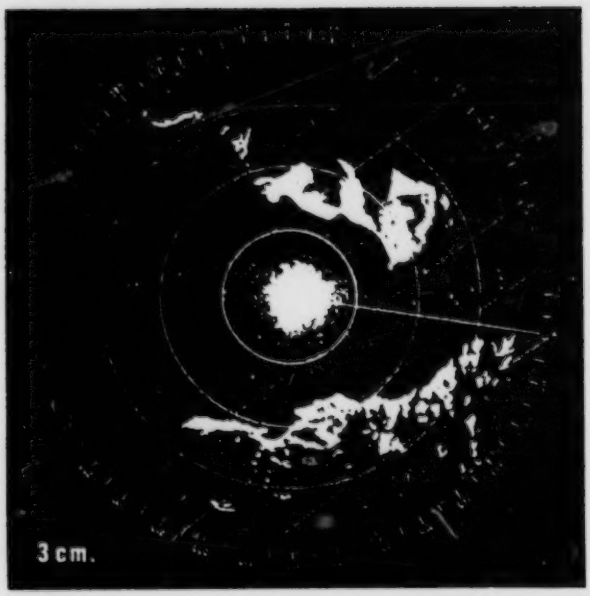
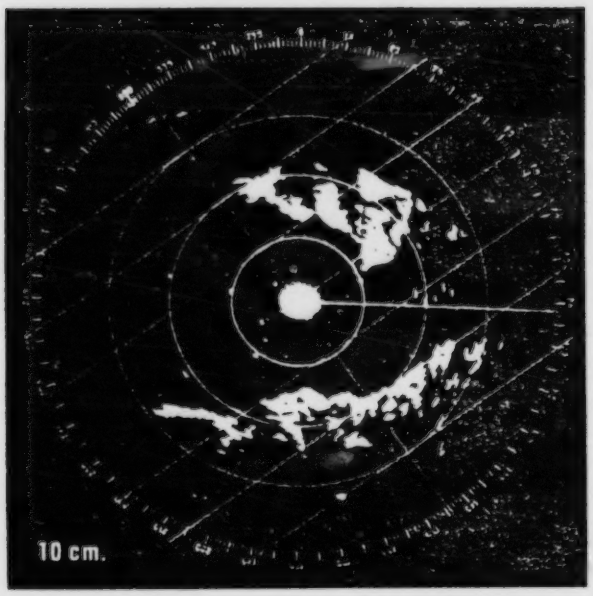
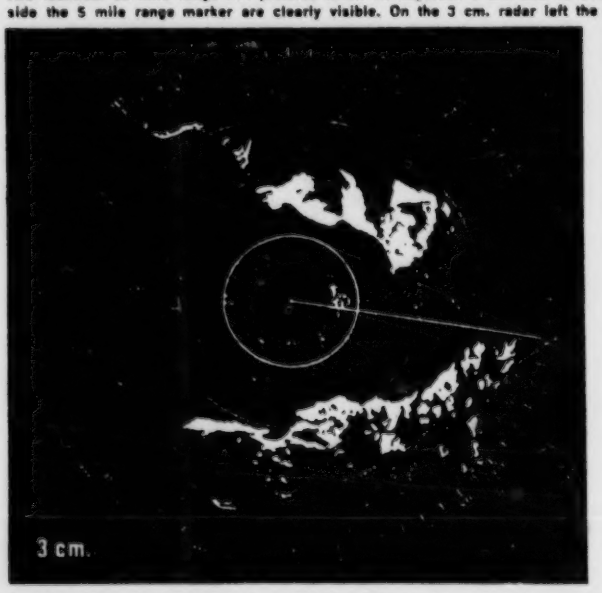
Figure I-24.—Effects of rain and sea on PPI displays of radars having different wavelengths.

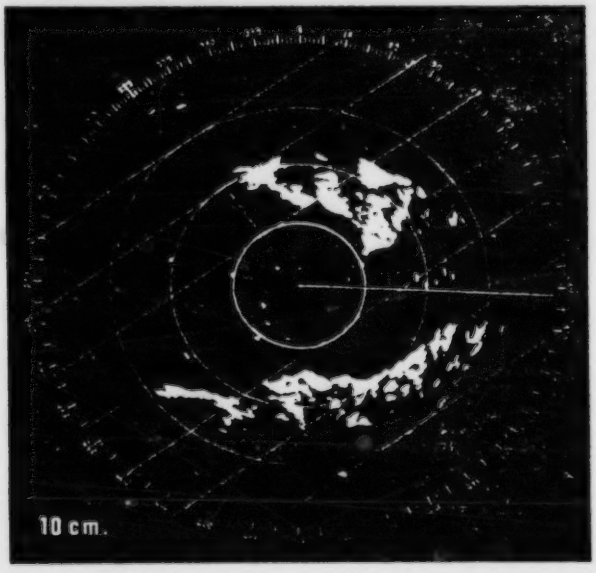
ANNEX I





Two identical 20 mile range PPI pictures taken on Raytheon 3 cm. and 10 cm. radars showing the effects of sea clutter. On the 10 cm. radar right targets inside the 5 mile range marker are clearly visible. On the 3 cm. radar left the close range targets are missing.





On both radars the anti-sea clutter control has been carefully adjusted to remove sea clutter. The close range targets are clearly visible on the 10 cm. right, whereas they are missing on the 3 cm. radar left.

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Figure I-25.—Effects of sea on PPI displays of radars having different wavelengths.